A Comparative Analysis of Communication Skills in Scholarly Publications from Indonesia and Malaysia

Eny Winaryati[1*], Salma Alifatun Nisa[2], Widia Ismatun Janah[3], Naufal Daffa[4], Lingga Kesuma[5]

[1, 2, 3, 4, 5]*Universitas Muhammadiyah Semarang, Semarang, Central Java 50273 Indonesia*

enywinaryati@unimus.ac.id

Abstract. The 21st-century learning framework emphasizes the importance of 4C skills (critical thinking, creativity, collaboration, and communication), with communication being a fundamental competency essential for effective interaction in both organizational and educational contexts. This study employs a literature review methodology with content analysis techniques to examine communication skills in scholarly publications. The research sample consists of journal articles in chemistry, chemistry education, and science education sourced from the SINTA database in Indonesia, alongside selected Malaysian journals from chemistry and science education programs. The findings reveal that in Indonesia, research on communication skills began emerging in 2014, with a significant increase in 2018, 2020, and 2021, predominantly employing qualitative descriptive methods with high school students as subjects, utilizing questionnaires as the primary data collection instrument, and employing qualitative and quantitative analyses. In contrast, in Malaysia, relevant publications began appearing in 2018 but exhibited a declining trend in subsequent years, with a predominant focus on quantitative research, using students as subjects, questionnaires as data collection instruments, and t-test analysis as the primary data analysis technique. These findings provide insights into the research trends, methodological approaches, and focus areas in studies on communication skills within Indonesian and Malaysian scholarly publications

Keywords: Komunikasi, 4C, tren penelitian.

1. Introduction

The learning process involves communication between teachers and students as well as among students. Effective communication in learning is essential, as teachers must possess strong communication skills to ensure that instructional content is delivered clearly and comprehensively, while students must be able to articulate their learning outcomes effectively. Communication is defined as the transmission of information, ideas, emotions, and skills through various symbolic representations, including words, images, and numerical expressions. Emphasize that mathematical communication plays a crucial role in constructing meaning, as it enables learners to engage in critical thinking and reasoning while expressing their mathematical ideas both orally and in writing, thereby enhancing their conceptual understanding [5].

© The Author(s) 2025

N. Nurcahyono et al. (eds.), *Procedings of the 3rd Lawang Sewu International Symposium on Humanities and Social Sciences 2024 (LEWIS HUSO 2024)*, Advances in Social Science,
Education and Humanities Research 933,
https://doi.org/10.2991/978-2-38476-428-0_19

The ability to communicate and interact effectively is essential in group and organizational settings, as communication serves as a central mechanism for fostering a conducive environment and ensuring continuous interaction among members. One specific form of human communication is interpersonal communication. Communication also functions as a means to facilitate and execute various activities aimed at achieving optimal objectives, whether within professional settings or interpersonal relationships. Advances in science and technology, particularly in the field of healthcare, have influenced communication practices, emphasizing the importance of appropriate language use and word selection. Effective communication requires consideration of contextual factors such as the setting, timing, audience, and purpose who states that the forms of speech used by speakers are motivated by their communicative intentions. This study examines a comparative analysis of communication-related articles published in journals on chemistry, mathematics, and science education in Indonesia and Malaysia, with a specific focus on the research methods and data analysis techniques employed in each study.

2. Methods

This study employs a literature review research design [2], which involves the systematic examination and critical analysis of existing knowledge, ideas, and findings within academically oriented literature. According to Cooper [3] a literature review synthesizes previous research to identify theoretical and methodological contributions to a specific topic. This study follows a content analysis approach, focusing on the findings of various studies published in scientific journals in Indonesia, with the aim of identifying trends, patterns, and gaps in the existing body of research.

The research method employed in this study is descriptive analysis, which systematically interprets and presents the collected data to facilitate a comprehensive understanding. This approach involves organizing, explaining, and interpreting the findings to ensure clarity and coherence for the reader. The process of article selection was conducted using multiple academic search engines, utilizing the keywords “communication” or “communication skills” for both Indonesian and Malaysian journal searches.

2.1. Data Source

Data for this study were obtained through content analysis of articles published in the Journal of Chemical Education and the Journal of Science Education. The articles selected for analysis were those indexed in the Science and Technology Index (SINTA) as of November 2022. SINTA (http://sinta2.ristekdikti.go.id/) is a platform developed by the Indonesian Ministry of Research, Technology, and Higher Education to assess the progress of scientific and technological research. The SINTA database includes 19 journals related to chemistry education and science education. Articles that specifically examined communication skills were identified and collected from these journals. A total of 69 articles containing the keywords "communication" or "communication

skills" were retrieved from SINTA levels 1, 2, 3, and 4, of which 28 articles were deemed relevant for analysis in this study.

In addition, this study also incorporated articles from Malaysian journals to compare the development of research on communication topics in Indonesia and Malaysia. Malaysian journal articles were sourced from various university-affiliated journals in Malaysia by utilizing institutional search engines with the keywords "education" and "literature science." One of the challenges encountered in this process was limited access to international journals, including those from Malaysia. To address this limitation, a strategic approach was employed by identifying relevant academic departments, programs, or faculties specializing in education and science, followed by locating associated journals. This process led to the identification of six public universities in Malaysia: (1) University of Technology Malaysia, (2) Tun Hussein Onn University Malaysia, (3) University Sains Malaysia, (4) Sultan Idris University of Education, (5) MARA University of Technology, and (6) University Kebangsaan Malaysia. From these institutions, 11 journals were selected for analysis, including *Sains Humanika, Malaysian Online Journal of Educational Sciences (MOJES), Asia Pacific Journal of Curriculum & Teaching (JUKU), Journal of Issues in Education, Journal of Technical Education and Training, Asian Journal of University Education (AJUE), Asia Pacific Journal of Educators and Education, Malaysian Journal of Education, Malaysian Journal of Science and Mathematics Education, The Journal of Science and Mathematics Letters (JSML), and EDUCATUM Journal of Science, Mathematics, and Technology (EJSMT)*.

The data collection process for articles from Malaysian journals focused on publications within the time span of 2016–2022, while articles from Indonesian journals were collected from the period of 2014–2022. The search for Malaysian journal articles was conducted using the keywords "communication," "communication skills," and combinations thereof within each identified journal. This search yielded 19 articles that contained these keywords and had relevant titles. However, only five articles were deemed suitable for analysis in this study. The exclusion of certain articles was due to their lack of alignment with the research focus, as they did not specifically address topics related to communication or communication skills.

2.2. Research Instruments

This study utilized an instrument adapted from Fauzi and Pradipta [4] to conduct a comprehensive content analysis. Seven main aspects were examined: (1) the number of publications per year, (2) the type of research, (3) research subjects, (4) chemistry and science topics investigated, (5) treatments applied, (6) data collection techniques, and (7) data analysis methods. Notably, categories for aspects (1), (4), and (5) were not predetermined due to the lack of prior studies that could serve as references for classification and to avoid overgeneralization when analyzing multiple articles. Conversely, categories for aspects (2), (3), and (6) were established before data collection. These categories are presented in Table 2, which is adapted (4)

Additionally, two further aspects were incorporated into this study: region and SINTA classification. The inclusion of these aspects aligns with the research objective of comparing the development of communication skills-related articles in Indonesia and Malaysia. The SINTA classification was introduced to categorize articles based on their indexing levels (SINTA 1, 2, 3, and 4), as a higher SINTA ranking (e.g., SINTA 1) indicates greater credibility and suitability for use as reference material.

Table 1. Aspects and Categories used for Content Analysis in the Study

Aspects	Categories	
Type of Research		
Research Subject	A.1-R&D	A.6-Descriptive Qualitative
	A.2-PTK	A.7-Quasi Experiment
	A.3-Quantitative Research	A.8-Pre Experiment
	A.4-Qualitative Research	A.9-Weak Experimental
	A.5-Quantitative Descriptive	
Data Retrieval Technique	C.1-Simple Random Sampling	C.5-Observation
	C.2-Sistematic Sampling	C.6-Test
	C.3-Cluster Random Sampling	C.7-Not Identified
	C.4-Purposive Sampling	C.8-Other
Data Processing Technique	D.1-Mean	D.6-ANCOVA
	D.2-Percentage	D.7-Correlation
	D.3-N-gain	D.8-Not Identified
	D.4-T-test	D.9-Other
	D.5-ANOVA	

2.3. Data Analysis

Each article was categorized based on predefined aspects that aligned with the research criteria. The classification process was determined by analyzing information presented in the abstract, methodology, and discussion sections of each article. The collected data were then systematically processed and visualized using bar charts to facilitate a clearer representation of trends and patterns.

3. Results and Discussions

3.1. Number of Publications

The number of publications reflects the extent of research conducted on communication skills each year. Based on the data presented in Figure 1, studies on communication skills in Indonesia began to appear in 2014. During the first three years, the number of publications remained relatively stable without significant growth. However, in the fourth year (2017), a decline in the number of publications was observed, a trend that also occurred in 2019 and 2022, where the number of publications decreased to

approximately half of the previous year. Conversely, a notable increase in publications was observed in 2018, 2020, and 2021, with higher publication rates compared to preceding years. This upward trend suggests a growing interest among researchers in investigating communication skills, highlighting its increasing relevance as a subject of academic inquiry.

The data collection process commenced in 2016; however, the publication of articles on communication skills in Malaysian journals was first observed in 2018. In subsequent years, the number of publications exhibited a declining trend. According to the graphical representation of the data, no publications were recorded in 2019 and 2021, while only one article was published in both 2020 and 2022. Overall, the number of articles addressing communication skills in Malaysia remains limited. From the analysis of data sources across six universities, only five articles discussing communication skills in education were identified between 2016 and 2022.

The limited number of publications on communication skills in Malaysia can be attributed, in part, to restricted access to journals and articles across Malaysian universities. However, this scarcity of publications presents an opportunity for future research. The relatively low volume of studies in this area highlights the potential for further exploration and academic contribution. Encouraging more research on communication skills is essential, given that these competencies are crucial for success in the 21st century. Increased scholarly attention to this topic may contribute to a broader understanding and enhancement of communication skills within educational and professional contexts.

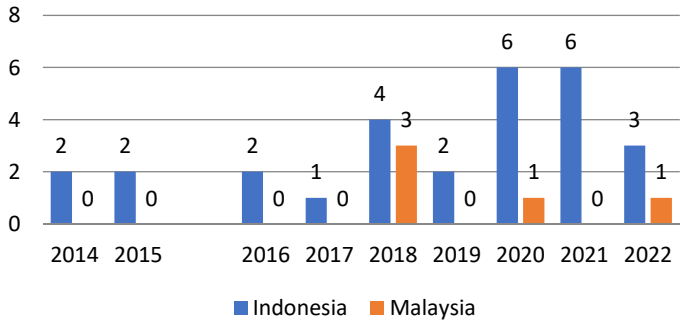


Figure.1 Trend of Increase in the Number of Educational Publications on Communication in Indonesia and Malaysia in 9 Years.

Research is often initiated based on a researcher's awareness of prevailing issues within their environment. One of the current challenges in Indonesian education is the relatively low level of communication skills among students. Addressing this issue requires a systematic and evidence-based approach through research. By conducting studies, researchers can identify and develop effective instructional models and interventions aimed at enhancing communication skills in the educational context. This research-driven approach is essential for formulating strategies that can improve the

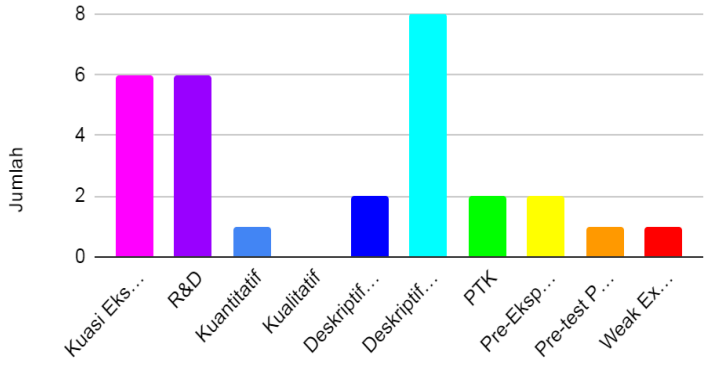
quality of communication in Indonesian education, thereby contributing to the overall development of students' competencies in the 21st century.

The primary objective of research is to enhance educational practices. This principle underscores the notion that increased research on communication skills will yield significant positive impacts on Indonesian education. Several factors support this assertion: (1) research findings serve as credible sources of information that can be effectively implemented by educators; (2) they provide a fundamental basis for educational decision-making at national, regional, and institutional levels; and (3) they contribute to shaping teachers' perspectives and pedagogical approaches [14]

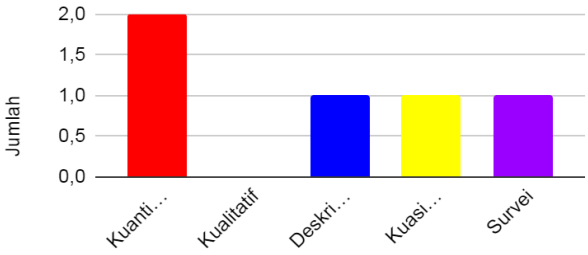
3.2. Type of study

The type and design of a study play a crucial role in determining the research focus. Based on Figure 2, the predominant research design employed by Indonesian researchers in studying communication skills is descriptive qualitative. This research approach is the most frequently utilized; however, quasi-experimental and research and development (R&D) studies are also conducted in considerable numbers. In contrast, quantitative research is the most commonly employed methodology in Malaysian articles. Additionally, Malaysian researchers utilize other research designs, including descriptive, survey, and quasi-experimental approaches.

Quantitative research involves the collection and analysis of numerical data, utilizing statistical methods to interpret findings. The type of statistical analysis employed varies depending on the specific research objectives and analytical requirements. This research approach is primarily used to test hypotheses, with the outcome determining whether the proposed hypothesis is accepted or rejected. Furthermore, quantitative research is also applied in the development of mathematical models to represent and analyze various phenomena systematically.



a



b

Figure. 2 (a) Types of Research used in Analyzing Various Communication Skills Articles in Indonesia (b) Types of Research used in the Analysis of Various Communication Skills Articles in Malaysia

According to Hennink et al. [8] qualitative research is an approach that enables researchers to explore experiences in depth using various methods, including in-depth interviews, focus group discussions, observations, content analysis, virtual methods, and life histories or biographical studies. Sarantakos [10] argues that the emergence of qualitative research was a response to the limitations of quantitative research in capturing the complexity of social phenomena. Unlike quantitative approaches, qualitative research allows researchers to examine topics from their own perspectives and gain a deeper understanding of the meanings and interpretations associated with behaviors, events, or objects.

The relatively recent development of qualitative research in the academic field has contributed to its increasing adoption by researchers [13] and its application has continued to expand across various institutions over the past few decades [7]. In practice, qualitative research investigates human behavior within natural settings, allowing researchers to analyze individuals' actions and experiences within the context of their daily lives, ensuring a more comprehensive understanding of the subject matter [5].

Descriptive qualitative research aims to systematically describe and illustrate existing phenomena, whether naturally occurring or influenced by human intervention. This research approach emphasizes the characteristics, quality, and interrelationships among various activities. Unlike experimental research, descriptive research does not involve manipulation, intervention, or alterations to the variables under investigation. Instead, it seeks to present an objective account of a given condition in its natural state. Data collection methods in descriptive research typically include interviews, observations, and documentation.

3.3. Research Subjects

Effective communication skills are essential across various disciplines, as they are recognized as a fundamental competency in the 21st century. According to the Partnership for 21st Century Skills (P21), communication is one of the "4Cs"—alongside collaboration, critical thinking, and creativity—that are critical for success in

the modern era. These competencies contribute significantly to both social and intellectual capital, enhancing individuals' ability to interact, collaborate, and innovate in diverse professional and academic settings.

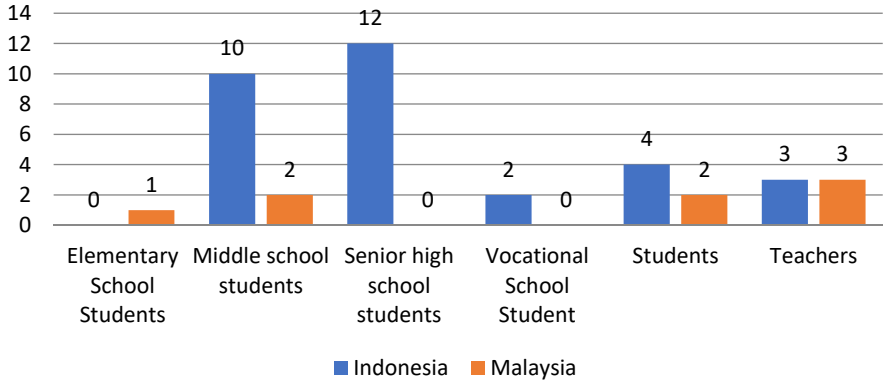


Figure.3 Research Subjects in the Analysis of Indonesian and Malaysian Articles

In the field of education, effective communication skills are essential in all interactions, whether between teachers and students or lecturers and university students. The development of these skills can be fostered among both educators and learners. As illustrated in Figure 3, research conducted in Indonesia predominantly focuses on high school students, with descriptive qualitative research being the most commonly employed methodology. This suggests that researchers aim to assess students' communication skills through direct observations, interviews, and documentation rather than relying solely on test results or student activity sheets.

In addition to descriptive qualitative research, quasi-experimental studies are also widely used. This indicates that researchers seek to compare various instructional designs or learning models to determine their effectiveness in enhancing students' communication skills. The prevalence of high school students as research subjects aligns with findings [12], who reported that high school samples are the most frequently used in research, accounting for 68% of studies. Similarly, a study [14] found that high school students were the most commonly selected subjects in research on learning media trends in mathematics education journals [11].

Research conducted by [14] indicates that as the educational level increases, higher-grade classes are less frequently selected as research subjects. This trend aligns with the common practice in many schools, where administrators are more selective in granting research permissions for final-year students due to their intensive preparation for national examinations.

In contrast, studies published in Malaysian journals predominantly focus on university students, with quantitative research being the most frequently employed methodology. This suggests that researchers aim to test hypotheses related to communication skills among university students. Furthermore, the preference for university-level subjects

may also reflect an interest in developing models that enhance communication skills within higher education, particularly among undergraduate and graduate students.

3.4. Topic

According to Chippetta (as cited in Prasetyo [9]), science encompasses three fundamental aspects: a way of thinking, a method of investigation, and a body of knowledge. As a body of knowledge, science represents a systematic compilation of findings produced by scientists. These findings may take the form of facts, concepts, principles, laws, or theories, all of which contribute to the advancement of knowledge within specific disciplines, such as physics, chemistry, and biology.

Based on this perspective, some studies focus on a single scientific topic, while others explore multiple topics within their research scope. In this study, multiple topics were selected to serve as pilot research areas in the context of education in Indonesia, aiming to provide a comprehensive understanding of communication skills across different scientific fields.

Table 2. Selected topics on Article Analysis

Topics	1. SCIENCE 2. Chemistry 3. Biology	4. Physics 5. Math

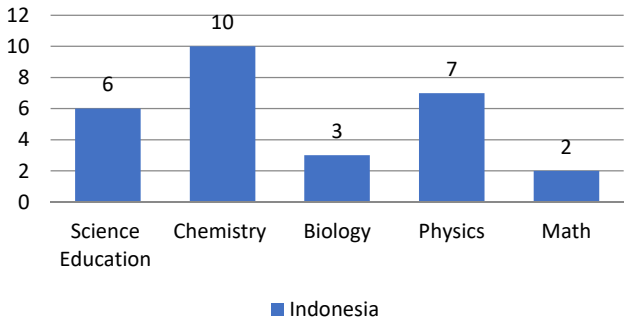


Figure 4. Materials in Article Analysis in Indonesia

Chemistry as a Dominant Research Topic

Chemistry is the most frequently selected topic by researchers in Indonesia when investigating communication skills. A total of 10 publications focused on chemistry-related topics, each integrating different subject materials to explore their relationship with communication skills. Additionally, mathematics was also a commonly chosen topic, with 7 publications, followed by general science, which appeared in 6 studies. The prevalence of science topics in studies involving junior high school students is likely due to the structure of the junior high school curriculum, which presents science

as a broad, integrated subject rather than as separate disciplines like physics, chemistry, or biology.

According to Hungerford, Volk, and Ramsey (6) science is characterized by three key aspects: (1) the process of acquiring knowledge through empirical methods, (2) the systematic and logical organization of information derived from investigations, and (3) the application of critical thinking to generate reliable and valid knowledge. Given these characteristics, the integration of science topics into research on communication skills is particularly relevant. The study of science inherently requires both students and teachers to engage in information acquisition, critical evaluation, and the production of valid knowledge—all of which are essential components in developing effective communication skills.

In contrast, research conducted in Malaysia did not explicitly specify the instructional materials utilized in their studies. For instance, a study investigated social behavior among students with special needs, with research subjects comprising elementary and junior high school students. However, this study did not provide clear information regarding the specific subject matter or learning materials employed during the research process. Instead, the researchers utilized an assessment instrument designed to evaluate student behavior, which included components related to communication skills.

Data Collection Instruments

Research instruments play a crucial role in facilitating data collection and ensuring the reliability and validity of research findings. These instruments serve as tools used by researchers to systematically gather data and can take various forms, such as questionnaires, checklists, interview guides, observation sheets, test items, rating scales, and inventories. In the context of communication skills assessment, various instruments have been developed and validated in previous studies to measure different aspects of communication competence effectively .

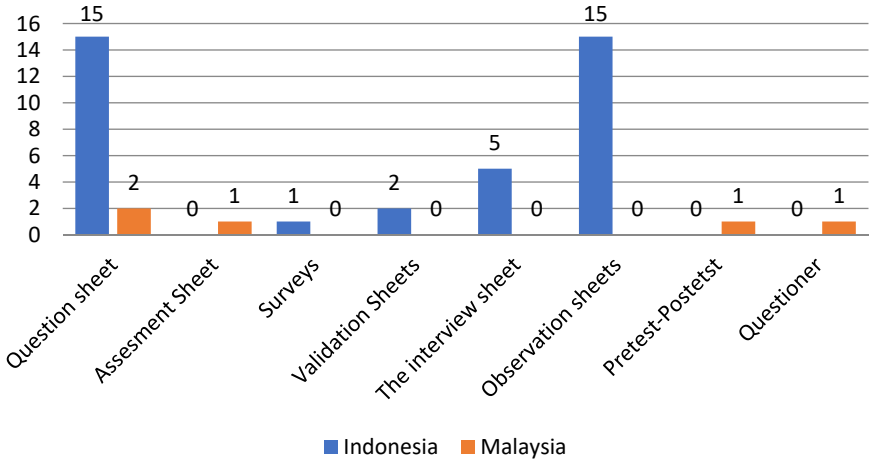


Figure 5. Data Collection Instruments on Indonesian and Malaysian Articles

Data Collection Instruments

As illustrated in Figure 5, question sheets are the most frequently utilized instruments by researchers in both Indonesia and Malaysia for assessing communication skills. Communication skills involve the exchange of information and experiences between individuals, contributing to cognitive development(1). Therefore, employing test-based instruments with high-order thinking questions enables research subjects to enhance their reasoning abilities through interactive discussions and information exchange.

In addition to question sheets, observation sheets are also widely employed by researchers in Indonesia, with 15 publications utilizing this instrument. This aligns with the findings in Figure 2, which indicate that descriptive qualitative research is the predominant research design. Since descriptive qualitative studies often require direct data collection, observations serve as an essential tool for assessing communication skills in real-time. Through observations, researchers can analyze participants' interactions and engagement in communication, providing a more comprehensive understanding of their abilities in acquiring and conveying information.

3.5. Data Analysis Methods

The appropriateness of data analysis techniques significantly influences the validity and reliability of a study. According (2), errors in selecting data analysis methods can lead to inaccurate conclusions. As depicted in Figure 2, eight publications utilize descriptive qualitative research. However, the data analysis techniques employed in these studies are categorized as "other," indicating that they do not fall within predefined classifications of data analysis methods.

The unspecified data analysis techniques in Indonesian publications predominantly involve qualitative and quantitative approaches. This corresponds to the prevalence of descriptive qualitative research as the dominant methodology. Furthermore, a notable number of researchers utilize the N-gain analysis technique, as reflected in the data. This suggests that N-gain is frequently employed to measure and compare improvements in participants' scores from pretest to posttest, thereby providing insights into the effectiveness of interventions in enhancing communication skills.

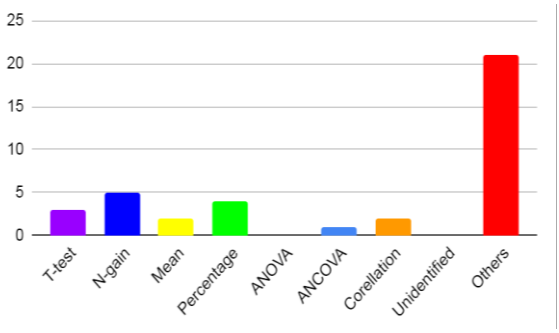


Figure 6. Data Analysis Techniques in Indonesian Article Analysis

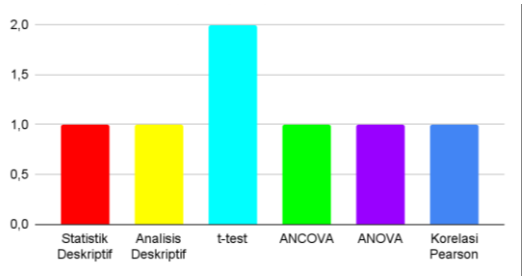


Figure 7. Data Analysis Techniques in Malaysian Article Analysis

Pretest and posttest assessments were conducted using question sheet instruments, with the results analyzed using the N-gain formula to evaluate the effectiveness of the intervention. Qualitative analysis was also frequently utilized, particularly for analyzing responses from communication skills question sheets and observational data. This approach allows researchers to gain a deeper understanding of participants' communication abilities beyond numerical scores.

Additionally, percentage-based data analysis techniques were employed to assess students' communication skills after the implementation of specific learning methods or newly developed instructional media. This method quantifies improvements by calculating the proportion of students who demonstrated enhanced communication skills post-intervention.

In Malaysian studies, the t-test was the predominant data analysis technique, aligning with the prevalence of quantitative research methodologies. The t-test is commonly used to compare two sets of data and determine whether there is a statistically significant difference between them, such as differences in pretest and posttest scores or between control and experimental groups..

4. Conclusions

The trend of research publications in Indonesia exhibited a notable increase in 2018, 2020, and 2021, followed by a significant decline in the past year. Similarly, in Malaysia, the number of published articles began to rise in 2018 but showed a downward trend in subsequent years.

In terms of research methodology, qualitative descriptive research emerged as the dominant approach among studies conducted in Indonesia, whereas quantitative research was more prevalent in Malaysian publications. In Indonesia, qualitative descriptive research was widely utilized to investigate communication skills.

High school students were the most frequently selected research subjects, with chemistry being a prominent topic in numerous studies conducted in Indonesia. Moreover, question sheet instruments were commonly employed by researchers to assess communication skills, with data analysis methods incorporating both qualitative and quantitative techniques.

Conversely, in Malaysian journals, university students were the predominant research subjects. The primary data collection instruments used in these studies were question sheets, while the t-test was the most frequently applied data analysis technique, consistent with the dominant quantitative research approach.

Based on the findings of this study, several recommendations are proposed for future research. First, there is a need to increase the number of publications employing quantitative research methods to enhance the understanding of communication skills development through statistical analysis. Second, researchers should provide clear documentation of the instruments used, including detailed information on their validity and reliability, to ensure methodological rigor. Lastly, it is essential for researchers to select the most appropriate statistical tests that align with the formulated hypotheses and research design to enhance the accuracy and reliability of their findings.

References

1. Abizar. 1988. Komunikasi organisasi. Jakarta: Depdikbud Dirjen Pendidikan Tinggi P2LPTK.
2. Ary, D, dkk. 1982. Pengantar Penelitian dalam Pendidikan. (Penterjemah: Arief Furchon). Surabaya: Usaha Nasional
3. Cooper, H.M. 2010. Research Synthesis and Meta-Analysis: A Step-by-Step Approach. Sage, Thousand Oaks.
4. Fauzi, A., & Pradipta, IW 2018. Metode penelitian dan teknik analisis data pada artikel pendidikan yang diterbitkan oleh jurnal pendidikan biologi Indonesia.
5. Haryono, Cosmas Gatot. 2020. Ragam Metode Penelitian Kualitatif. CV Jejak (Jejak Publisher), anggota IKAPI.
6. Hungerford, H. R., & Volk, T. L. 1990. Changing learner behavior through environmental education. Journal of Environmental Education
7. Mohajan, HK 2018. Metodologi penelitian kualitatif dalam ilmu sosial dan mata pelajaran terkait. Jurnal Pembangunan Ekonomi, Lingkungan dan Manusia. 7(1)
8. Monique Hennink, Inge Hutter dan Ajay Bailey. 2011. Qualitative Research Methods. London: SAGE Publications.
9. Prasetyo, K.Z. 2013. Pembelajaran Sains Berbasis kearifan Lokal. Seminar Fisika dan Pendidikan Fisika 2013. ProgramStudi Pendidikan Fisika FKIP-Universitas Sebelas Maret.
10. Poerwandari, Kristi. Pendekatan Kualitatif untuk Penelitian Perilaku Manusia, Jakarta: Fakultas Psikologi UI, 2005.
11. Pulungan, Anggi Reviani dan Fibri Rakhmawati. 2022. Tren Media Pembelajaran Matematika dalam Jurnal Pendidikan Matematika di Seluruh Indonesia. Jurnal Cendekia: Jurnal Pendidikan Matematika. 6 (3).
12. Ridho, Muhammad. 2018. SKRIPSI. Analisis Tren Penelitian dalam Bidang Pendidikan/Pembelajaran Biologi di Indonesia. Program Studi Tadris Biologi-Institut Agama Islam Negeri:Batu Sangkar.

13. Sharma, S. 2013. Pendekatan kualitatif dalam penelitian pendidikan matematika: tantangan dan solusi yang mungkin. Jurnal Pendidikan. 2(2)
14. Susetyarini, E., & Fauzi, A. 2020. Trend of Critical Thinking Skill Researches in Biology Education Journals Across Indonesia: From research design to data analysis. International Journal of Instruction. 13 (1).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.